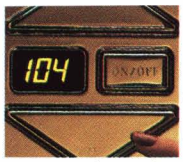
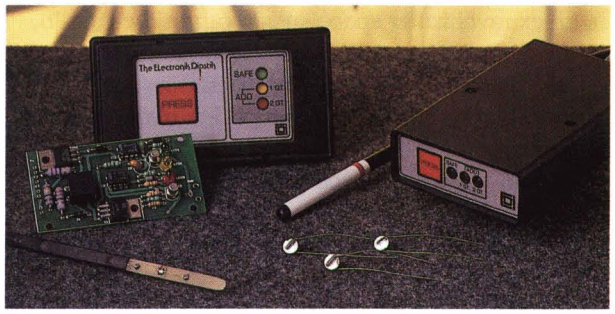


Electronic Dipstick



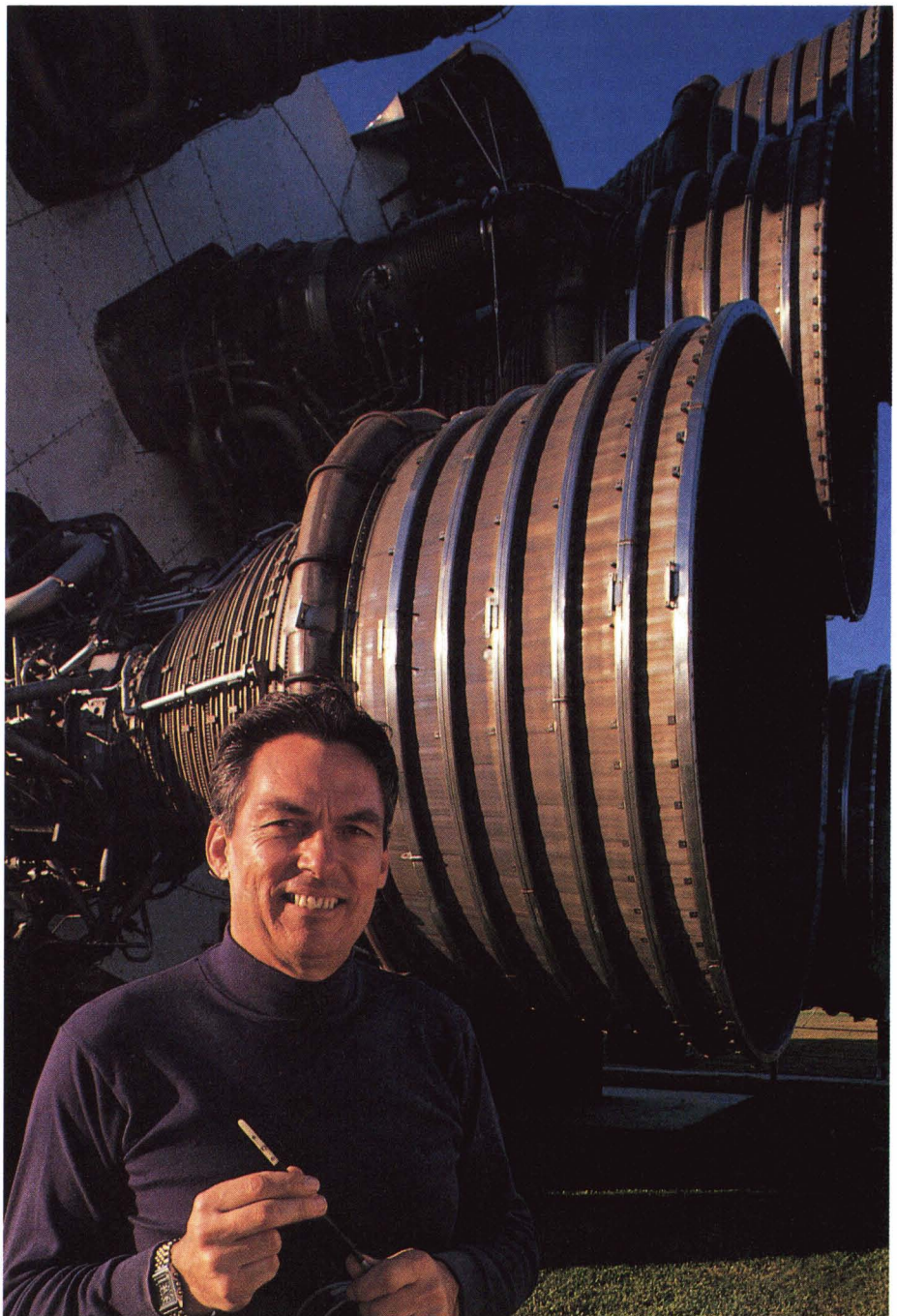
At right is a space-derived innovation known as the Electronik Dipstik, a device that automatically monitors crankcase or transmission fluid levels in automotive vehicles and presents the motorist with a visual indication of the fluid level. The Dipstik was developed by Creative Designs and Inventions (CDI), Houston, Texas, a company that specializes in adapting aerospace technology to consumer and industrial products.

In the photo, the product on the left is the dashboard unit for recreational vehicles, trucks or boats; on the right is a smaller model for under-dash installation in autos. The tubelike fiberglass wands are the dipsticks, one with its sheath removed to show the sensors; the sensors are pictured separately in the foreground.

A new device automatically monitors crankcase or transmission fluid levels in automotive vehicles

The Electronik Dipstik employs NTCs (Negative Thermistor Coefficients), tiny components that experience a change of resistance with a change in temperature; that characteristic is the basis for fluid level measurement.

NTCs play an important role in a Space Shuttle launch. The power of the Shuttle Orbiter's three liquid-fueled main engines tends to swing the engine nozzles from side to side, changing the thrust line. However, the change is prevented by NTCs in a hydraulic cylinder; they sense a resistance change that, analyzed by a microprocessor, indicates the swing of



the nozzle. The microprocessor immediately sends a signal to a servo-motor, which repositions the nozzle so that the engine's thrust is properly delivered through the centerline. **At left,** CDI president Ron Doak poses with the rocket engines whose technology was adapted to the Electronik Dipstik.

CDI markets the device, but it is produced by Lake-Tronics, Corvallis, Oregon. The NTCs are supplied to CDI by Katema, Rodan Division, Anaheim, California. The Space Shuttle system from which the NTC technology was adapted is known as the Rotary Variable Differential Transformer. Developed by HR Textron, a subsidiary of Textron, Inc., this system keeps the rotary motion of the Orbiter's engines under control by maintaining the proper thrust line.

In automotive use, NTCs are placed at predetermined levels in the tubular dipstick — for example, full, one quart low or two quarts low — and electrically heated to a predetermined temperature. When anything — such as the oil or transmission fluid — touches the NTC, it will dissipate heat and create a resistance change; microprocessor analysis of the resistance change indicates the fluid level. The dipstick is installed in an auto simply by placing the old dipstick within the tube, as pictured **above,** and wiring the dipstick to the microprocessor/display component. At the press of a button, the dashboard unit **(below)** shows the appropriate level.

Four major auto manufacturers, two U.S. and two foreign, are testing the device for possible application to their cars. The applicability of the device goes well beyond vehicular use, CDI officials say. They are contemplating development of special units to monitor fluid levels in underground and remote storage tanks. They add that the device will work for any non-solid commodity and thus can be applied to measurement of such products as wheat, flour, sugar and sand.

The device will work for any non-solid commodity